SCIENCE

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Biographical Directory of American Men of Science

The undersigned is compiling a third edition, revised and enlarged, of The Biographical Directory of American Men of Science, the completion of which had been postponed by the war. It is intended that the directory shall contain brief biographies of all those in America who have worked in the natural and exact sciences. He will be under great obligations to those who will fill in and return this blank.

J. McKEEN CATTELL

Garrison-on-Hudson, N. Y.

Full name with title and mail address, the part of the name ordinarily omitted in correspondence being in parentheses—e. g., Prof. J(ohn) W(ilson) Smith, 1234 Lincoln St., Washington, D. C.

Department of investigation

Place and date of birth

Education and degrees, including honorary degrees, with dates

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Positions with dates at which they were held

Temporary or minor positions and honors, such as lectureships, trusteeships, scientific expeditions, prizes, medals, etc.

Membership in scientific societies and offices with dates at which they were held

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Chief subjects in which research work has been published or is now in progress

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MSS. intended for publication and books, etc., intended for review should be sent to The Editor of Science, Garrison-on-Hudson, N. Y.

BOTANICAL PARTICIPATION IN WAR WORK[1]

FROM the subject assigned me in this symposium, which, by the way, was before the armistice was signed, one naturally would suppose that what was expected was a catalogue of the achievements of botany during the war. From the amount of time allotted for this effort it becomes equally obvious that no such thing is possible. I therefore find myself in the delightful position of being free to disregard the subject (for no one can disregard the time limit) and shall discuss some aspects of the way in which botany may be regarded as having accomplished its full share in the world struggle, as well as attempt to point out the overwhelming importance of a recognition of the place the subject should occupy in any peace plan. This I shall hope to do without encroaching unduly upon the subjects assigned to those in this or other symposiums which have been announced, although I am inclined to think that at this time there cannot be too great a reiteration of the fundamental facts calculated to impress the public at large with some of the reasons which justify the existence of the science of botany.

Of course, one might attempt to point out the achievements of botanists, who, because of their special interests or training, have been of invaluable assistance in suggesting various botanical raw materials for which the commercial man was seeking, or in obtaining the right kind of sphagnum for surgical dressings, or their part in the work of the Bureau of Air Craft Production or the Sanitary Corps or in the perfection of the gas mask and similar strictly war work. Then if one were permitted to dwell upon the far-reaching effect of the agricultural application of botanical investi-

[1] Read at the Symposium of Section G, American Association for the Advancement of Science, Baltimore, December 26, 1918.

gations, not forgetting the activities of the plant pathologist, there would be no difficulty whatsoever in making a case for botany of which none of us need be ashamed.

The botanists of the world apparently left it to the Germans to devise the ultimate way in which a knowledge of plants could be adapted for purposes of war. At least the following incident given by a war correspondent, which appeared in print but not vouched for by me, may be accepted as an illustration of a method of applying taxonomy, which, to say the least, is capable of wide use. A man in a German uniform was brought into a German camp, suspected of being a spy. He claimed to have come from a certain part of the front and to be the bearer of an important verbal message concerning the movements of troops, the ordinary methods of communication having been shot away. Immediately the camp algologist was summoned and samples of mud from the boots of the prisoner as well as dirt from his finger nails were examined microscopically. The botanist reported finding *Conferva utriculosa* Kurtzing or *Tribonema utriculosum* Hazen, according to the nomenclatorial code approved by the General Staff, together with certain blue-greens and diatoms which constituted a characteristic flora of a region quite different from that from which the prisoner claimed to have come. In fact, by consulting the charts prepared by botanists for this purpose it was possible to indicate that the man had been in Russia. Confronted with this overwhelming evidence the victim of applied botany confessed that he was a Russian spy and was shot at sunrise.

The rôle that the ecologist might play in connection with camouflage and the aeroplane service was suggested at the meeting a year ago and need not be amplified here, although the temptation to do so is great. But with the close of the war, which obviously was not expected at the time this symposium was arranged for, such things considered from the standpoint of military effectiveness seem more or less out of date and we need to turn to more vital matters.

For the past four years and more, science has been subservient to war needs. The importance of any investigation has been distorted and magnified. A trivial piece of work conceived and finished in a week might be more useful in waging war than a lifetime spent in producing fundamental results which have no military value. Thank God, however, we are not always at war.

It is likewise well to bear in mind that one should be cautious in citing too freely, as has been common in the past, the supposedly favorable attitude which Germany has held for all things scientific. May it not be that this tendency held up as a model for all the world and manifesting itself in most substantial subsidations, was merely another form of propaganda, or at least primarily for the purpose of receiving every possible aid from every science which could contribute in the slightest way to building up a perfect war machine? In view of all that has transpired one is justified in questioning whether the underlying idea of the Teutonic mind was not science for science's sake—but science for war's sake.

When the Botanical Committee of the National Research Council was first formed it was apparently expected by some that this aggregation of botanical lights would assemble and after solemnly mentalizing on the whole situation would announce some discovery which would illuminate the world and win the war. Nothing could have been more absurd. So far as I know the only two suggestions which were made along the line of using botanical weapons for the direct destruction of life were rejected because they savored too much of Teutonic barbarity. Naturally the chief function of this or any other botanical committee could only be to have referred to it military problems requiring a knowledge of plants and their possibilities, in order that the most rapid and satisfactory solution be reached. That this was not always done until much valuable time was lost was not the fault of the botanists concerned, although it may have been the result of the general attitude of botanists, who, since they were freed from the demands made by *materia medica*, have regarded the birth of any botanical idea of prac-

tical importance as illegitimate, to be turned out into the cold to perish. These foundlings, however, were not infrequently rescued by some more enterprising member of a sister science and occasionally grew into most flourishing children of their foster parent.

Again we are all familiar with the fact that many of the most practical aspects of botany have grown to be of so much importance that they now assume the place of independent sciences, and are no longer recognized as having any connection with their mother science. In fact botany unadorned now stands in the minds of most people—including many scientists—as a synonym for the impracticable and the useless. The minute it becomes of value to man, either in peace or war, it must be called bacteriology or forestry or phytopathology. As a result of this wide-spread opinion we have a much-advertised achievement of another research council committee depending not only upon plants for the source of the product but also upon the application of botanical methods for the actual process of manufacture, yet with no reference whatsoever to botany. Another similar case is the recent establishment of a concern at present turning out more than seven tons a day of a product used in munitions, derived from corn. Although called chemical distillation, the process is one of fermentation, produced from pure cultures of an organism which is manipulated according to the practises devised in botanical laboratories.

Examples might be multiplied indefinitely of those who, working in other sciences, ask: "Can you tell me of a plant containing a certain kind of substance, where it grows, what is its name, whether it can be obtained in large quantities, and how to distinguish it from related plants? If so I can use the information in the solution of a problem upon which I am engaged." And after the questions are answered there appears an article based almost entirely upon the results of botanical investigations, for which the science chiefly concerned receives no credit whatsoever. This is no imaginary case. All botanists have had at least a few such experiences and were there time I might quote from letters received during the past year which would emphasize even more strongly this aspect of giving no credit where it is due.

It is probably true that botanists themselves are largely to blame for such a condition of affairs. Whether it be modesty or lack of interest or a failure to realize the importance of asserting themselves and emphasizing various aspects of science, the fact is self evident that altogether too much time in the past has been spent in criticism of others rather than attempting to correct their own faults. Perhaps we need a criterion by which botanical work may be definitely distinguished. We are obviously at a disadvantage in being confined to but one kingdom, while the chemist and physicist know no such limitations. But the plant kingdom certainly affords a reasonably wide field of endeavor, and presumably botanists are those concerned with plants—even plant physiologists. We calmly sit by and see aspects of our subject, which, according to present-day standards, make a thing worth while, appropriated for the benefit of other sciences because it is too much trouble or it is nobody's particular business to attend to such things.

Even the very name botany is avoided under the slightest pretext. New titles for branches of this science, usually with the prefix "chemical," are coined so fast that one can hardly keep up with them, and if to-morrow the cause of influenza or any human disease were proven to be due to a species of *Laboulbenia* or *Thelephora,* Dr. Thaxter or Dr. Burt, although at once taking first rank as applied botanists, possibly, much against their will, would over night lose all association with botanical science and become at the very least a Laboulbeniaceæologist or a Thelephoraceæologist. It may be too late to correct much of this sort of thing which already exists or to hope for a bureau in the Department of Agriculture that bears the name of botany, but why allow it to continue without a protest and taking steps to prevent similar efforts to smother our science in a multitude of misleading and detrimental names? If a man spends nine tenths

of his time working with plants why not call him a botanist, instead of—to take at random one of the most recent titles which has come to my notice—"assistant in horticultural chemistry and bacteriology?"

One difficulty in the past has been that the commercial man and the botanist have been too far apart. The war has helped to correct this situation, but much remains to be achieved. A few years ago there was published in the *Missouri Botanical Garden Bulletin* a short popular article by Dr. von Schrenk on "The lightest known wood—half the weight of cork." Because anything that is the lightest or biggest or most expensive in the world will gain the attention of the press, the article was widely reprinted. Consequently the Garden was besieged, by manufacturers in this country and abroad for information as to where the wood could be obtained. One might have supposed that the business man had exhausted every effort in an attempt to obtain such a product. As a direct result of the article there now exists in New York City the American Balsa Wood Corporation which does a large business in supplying this wood to those who need it. The botanist had had the information for years, but there was no adequate means of bringing it to the attention of those most concerned. Of course, had the account appeared under the title of "*Ochroma Lagopus*" the probability is that the industry in this wood would still be undeveloped, for the fact remains that botanists have been entirely too remiss in making known to the technical man the practical worth of his science. Much more important examples might be given, but I will refer to but one other experience in order to illustrate another phase of the matter.

Soon after the war broke out, one of the largest mail-order houses in the country sent to the Garden three umbrella handles for the purpose of having the wood identified. It being no longer possible to import these handles, the concern wished to see whether the word could be obtained in this country in order to have them manufactured here. When I tell you that one of the handles proved to be osage orange you will recognize that there was no great difficulty on this score. The point I wish to make is that had it been three chemicals or three ores to be examined and sources from which they could be obtained indicated, much would undoubtedly have been made—and rightly so—of the ability of the science concerned to help the commercial man. But because only a knowledge of botany was needed no publicity or no credit for the work was expected. Hundreds and possibly thousands of determinations of plants by botanists have been made since the outbreak of the war for the purpose of giving the manufacturer definite knowledge of the source and value of fibers, drugs, condiments, gums and other useful plant products. Some most fundamental and far-reaching results have thus been realized, but the standing of the botanist as a benefactor of mankind has been little if any changed. Perhaps if we returned to the old term of "plant analyst" and charged at the same rate a chemist would for making an analysis of an unknown, it might help to rehabilitate the botanist in the eyes of the business man. At any rate some means of obtaining the recognition due to the science concerned should be devised before all the work and benefit accomplished is forgotten. Similar instances from other lines of botany occur to all of you. Are we to continue along the same old path for the want of a definite plan calculated to improve the situation? I hope not.

But before I refer to this aspect of the subject, I wish to hasten to point out that all I have said must not be regarded as implying that the only aim of botanical science is to be of direct practical application. On the contrary, I would regard it as the greatest catastrophe which could befall botany and calculated to place it in a much worse position than it is—to neglect what is sometimes called pure botany or research. Still further, I am in hearty agreement with an opinion recently expressed in Science that it is a grave mistake to attempt to justify research by claiming that it may possibly lead to some practical result. "Research for research's

sake" is a motto which might well be posted in every botanical laboratory, and I believe we would all be the gainer by following such a precept. I have no patience with a worker who oscillates to and fro in an effort to include both pure and applied science in one single investigation. It reminds one of the correspondent who wrote to Harvey and described *Oscillatoria* as "fluttering back and forth on the borderland of the plant and animal kingdom." While some of us would like to think that a bit of our botanical research might be of practical importance, we can not hope to gain either one thing or the other by any deliberate effort to make an investigation pay for itself by any commercial standard. That abstract research sometimes brings concrete returns is true, but it generally requires a second part to make the practical application. When Naegeli wrote "On Oligodynamic Phenomena in Living Cells" he had no idea of solving the problem of a cure for certain bad odors and tastes in water supplies, although the necessity for a remedy for such conditions existed then as well as when the application of his work was made. Nor was it probable that any representation of a certain large corporation ever read Clark's paper "On the Toxic Effect of Deleterious Agents on the Germination and Development of Certain Filamentous Fungi," although the application of this research was the means of saving thousands of dollars and helping out a situation, which, because of the war, promised to be disastrous. It is an admission of weakness which no true student should grant for an instant—that *cui bono* must be the test of all botanical research.

Of course, when I refer to research I mean something worthy of the name. Perhaps there is no one thing about which so many harbor a delusion as that mystic form of scientific endeavor which is supposed to lift one above the common herd and land him in the very bosom of the scientists' heaven, namely research. It is sometimes referred to by the neophyte as "having a problem." Heaven knows, we all have problems enough—most of them very unscientific—but if they were no more real than the subjects for investigation of some of our scientists they would give us little concern.

Let us take an example: Suppose the Department of Scientific Restauranting in one of our large institutions of learning assigns to one of its graduate students the research problem of how many ham sandwiches may be obtained from a hog. Or if the president has not succeeded in shaving enough off of existing departments to add this important branch to his curriculum, the department of domestic science, or zoology, or, since the hog is normally vegetarian, the botanical department might undertake the investigation. In the first place it would be necessary to decide upon the standard size and weight of the ham to be ensandwiched. This would probably necessitate the granting of a traveling fellowship readily obtained from the representatives of one of the large packing houses in order that restaurants throughout the world might be visited and first-hand information obtained on which to standardize the slice of ham. Returning to the laboratory after perhaps a year's travel, the investigator would have accumulated innumerable bottles containing various samples properly preserved in alcohol or formalin and duly labeled with date and place of collection and such other environmental information as seemed necessary. It would then devolve upon the scientist to weigh and measure and plot curves until he had definitely decided upon the amount of ham which should be the basis of his investigation. This determined, he would then be free to turn his attention to the hog. I will not weary you with the details of the laborious and erudite investigation necessary to determine the amount of pure ham, suitable for sandwiches, which may be obtained from this animal. Of course, the easiest way would be to kill the hog, cook him and make him into sandwiches, but this would not be research as it is often practised—besides any one could do that and there would be no chance for scientific investigation. Nor need I dwell upon the discouragements and disappointments which the ardent seeker after truth would meet before the conditions of his problem were met.

A sudden fluctuation in the weight of the hog might upset all his calculations and the final answer be obtained only in time to hand in his thesis at the twelfth hour. After graduation there remains, of course, the investigation of the size, shape, consistency, etc., of the bread used in ham sandwich-making, whether rolls are permissible or not, the origin and history of the use of mustard, until at last, after years of labor, the most complete, the most exhaustive and the most learned monograph on the ham sandwich is given to the world, and the author is hailed as one of its leading scientists. He may then devote himself to the monographing of other sandwiches, finally becoming the world's authority on this group, having specimens sent for identification from every railroad station in every sandwich island and continent of the civilized world.

Absurd as the foregoing may seem, you all know that actual examples of so-called research work might be cited which would be not a whit more sensible. A serious examination of the countless papers published in any one of the sciences will reveal an appalling number of trivial, inconclusive, unscientific effusions, at the most mere petty records of hypotheses and haphazard observations, which far from being contributions to knowledge, are but a means of disclosing the ignorance of their authors of the first principles of science.

That such work should be bolstered up by the claim that possibly it might be turned to some practical application, is calculated to bring all research, good or bad, into disrepute. I do not believe that any member of a board of trustees or a prospective philanthropist is fooled by the attempt to justify herbaria or libraries or laboratories solely on the grounds of definite, practical usefulness to mankind in general. If botanical research is not of enough importance to sustain itself regardless of any incidental benefit that may arise through it, the greater portion of it would better be dispensed with in order that the time and effort and money now wasted be turned to something capable of standing on its merits.

It is to be hoped that either through the perpetuation of the Research Council, or better, through some committee representing all botanical interests, there may be an organized attempt to raise the general standard of research work in botany at least. But why stop here? Is it not time that botanists recognize in a tangible way their obligation to the public at large, and that we see to it that our profession takes a worthy part in the world work of the future? Perhaps it has in the past. If so, it behooves us more than ever to stand firmly for our rights and the recognition due us. In spite of the shudder that may pass over some of you present I venture to suggest that a committee of the Botanical Society of America on publicity might not be out of place. Other sciences which apparently need it less, have not hesitated to adopt such modern methods. There might also be added a committee on botanical raw materials, with sub-committees on economic or applied phases of certain special topics, or, if it seemed best, a general development committee which would deal with botanical ideals and ideas in a way calculated to crystallize the more essential activities of the science and make more tangible the benefits and achievements resulting from a fundamental knowledge of plants. Surely the need for something of this kind is quite as great as the object of committees already in existence. Perhaps too much attention can not be paid to the details of the multitudinous ramifications which sprang from the parent trunk, but we cannot afford, either for our individual or professional good, to neglect the subject as a whole. No time could be more propitious for accenting the place which botany holds. It may have been a "chemical war" which the world has suffered. I for one am perfectly willing to let it go at that. But should we not do something definite towards making it a botanical peace upon which we are about to enter?

George T. Moore
Missouri Botanical Garden

SAMUEL WENDELL WILLISTON[1]

Samuel Wendell Williston, our distinguished senior colleague in vertebrate paleon-

[1] Based on the author's article in *The Journal of Geology*, November–December, 1918.

tology, passed away August 30, 1918, honored and beloved by all who knew him. Our admiration for his character and achievements is enhanced through a perusal of his personal recollections[2] of his career, which reveal long struggles towards scientific attainment, lofty ideals of exploration and research, and an unfaltering determination.

Like all men of science who have risen to distinction, Williston was self-made, the impulses all coming from within; yet he was instinctively alert to seize every chance to learn and to expand his horizon. We can not imagine a life story more helpful than his to the youth predisposed to science who has both to discover his own talent and to explore every avenue of opportunity which presents itself.

Williston was born in Roxbury, now a part of Boston, July 10, 1852. He writes:

> The Williston family has been traced back to about 1650 in Massachusetts; they were about the usual run of common people, no one famous or even noted, whether for good or evil. . . . Some of them served in the War of the Revolution, and many were fishermen.

His father was born in Maine, and he remarks of this branch of the family:

> They knew little of schools. My father, if he ever went to school, did not take kindly to study, for he never learned to read or write. . . . It was a great pity, too, for my father was a man of far more than ordinary ability as a mechanic—he was noted always for his skill. . . . Of all his children I resemble him the most, both physically and mentally.

His mother was from England, having come with her parents to New Jersey about 1812. She had a fair common-school education, and the effects of her early English training and her accent remained through life.

The intellectual and social environment of Roxbury probably never would have produced a geologist or a paleontologist, and while the next step in Williston's life was hard, yet it was propitious, as the events proved:

> In the spring of 1857 my parents decided to emigrate to Kansas. A colony had left the year before for Manhattan, and the letters that came back had infected many with the desire to go West. . . . The abolitionists were urging eastern people to colonize the territory in order to help John Brown preserve it to the "Free States." . . . The trip was long and tedious, by rail to St. Louis, then a small place, and thence by steamboat up the Missouri River to Leavenworth. There was no Kansas City then. We reached Leavenworth about the twentieth of May. Here we remained a few days in a very small hotel, while my father bought a yoke of oxen and a wagon and such provisions and household things as were indispensable, and we started on the slow and tedious drive of 115 miles to Manhattan through a country but very sparsely settled. For the most part we children rode in the covered wagon while my father and cousin walked and drove the oxen.

The first building erected in the new town was the stone school-house, to which books were supplied by the Emigrant Aid Society. At the age of seven young Williston made his first collection of fossil shells, from deposits since determined as belonging to the Lower Permian. Following school, he entered the State Agricultural College in 1866. At the age of fifteen he came under the rare influence of Professor Benjamin F. Mudge, who loaned him a copy of Lyell's "Antiquity of Man." Mudge conducted all the courses in natural history, and through his splendid character and example exerted a great influence on young Williston. It was quite by accident, however, that seven years later Williston was included in Professor Mudge's party to northwestern Kansas (Smoky Hill Valley Cretaceous) where Professor Mudge, already famous through his discovery in 1872 of a specimen of *Ichthyornis*, was collecting.

Vertebrate paleontology had become his first love, but he had leanings towards human anatomy and medicine and entomology, first as an avocation and then as a vocation. He was afforded no independent opportunities for paleontological research and publication by Professor Marsh, by whom he was invited to come to New Haven in February, 1876. In the summer seasons of 1876 and 1877 he col-

[2] See "Recollections," an unpublished autobiography, written May, 1916, copyrighted by Mrs. S. W. Williston.

lected with Professor Mudge in the Cretaceous chalk of Kansas. In 1877 he was sent by Professor Marsh to the Morrison, Canyon City and Como quarries to cooperate with Professors Lakes and Mudge and Mr. Reed in taking out the types of *Atlantosaurus, Diplodocus* and other sauropods. In Professor Marsh's laboratory Williston worked on the dinosaurs. In the field in 1878 he helped to collect the "Jurassic Mammals" and some of the smaller dinosaurs. For nine years (1876–85) he worked in Professor Marsh's laboratory, where he became closely associated with Marsh's other assistants, especially Harger and Baur.

While acting as assistant in paleontology he studied medicine at Yale, received the degree of M.D. in 1880, continued his post-graduate studies, and received the degree of Ph.D. at Yale in 1885. He then became demonstrator of anatomy (1885–86) and professor of anatomy (1886–90) at Yale and practised medicine in New Haven, where he was health officer in 1888–90. In 1886 he published some criticisms of Koken's work on *Ornithocheirus hilsensis* which give us some hint of his abiding interest in Kansas fossil reptiles, an interest which was soon to bring great results.

The turning-point in his scientific career, from anatomy and medicine to paleontology, came at the age of thirty-eight, when he returned to the University of Kansas as professor of geology. Kansas was the scene of his first inspiration in paleontology, and here his fossil studies and vigorous health marked the happiest period of his life. He taught both vertebrate and invertebrate paleontology, anatomy, and medicine, and several of his students have achieved distinction in these fields.[3] With respect to the breadth of his studies and of his influence at this time, his life was comparable only to that of Joseph Leidy, who, it will be recalled, was at once an anatomist, a physician, a paleontologist and a microscopist of distinction. He soon began to publish studies on the Cretaceous reptiles of Kansas. Henceforth Kansas plesiosaurs and turtles, mosasaurs and pterodactyls, were the subjects of a long list of papers mostly in the *Kansas University Quarterly,* from 1890 to 1899, with occasional articles on Kansas fossil mammals (*Platygonus, Aceratherium, Teleoceras fossiger*). Meanwhile he made many explorations of the Cretaceous of Kansas for fossil reptiles. At Kansas University Williston also kept up his two avocations of anatomy and dipterology; he served as professor of anatomy and dean of the medical school. He also continued to publish many papers on recent diptera. He accomplished a great work on this group and became the leading dipterologist of the United States. His studies culminated in the preparation of his "Manual of North American Diptera," a book which is indispensable to a beginner in dipterology and a very great convenience to advanced workers.

[3] Among these paleontologic students, who have since become known for their researches, were: E. C. Case, C. E. McClung, Roy L. Moodie, Herman Douthitt, Alban Stewart, Elmer S. Riggs, Barnum Brown, M. G. Mehl, E. B. Branson and E. H. Sellards.

Paleontologic Work in Kansas[4]

Williston's paleontologic contributions on the Cretaceous fauna of Kansas began in 1879 with a short paper entitled "Are Birds Derived from Dinosaurs," and included fifty-three communications, chiefly to the Kansas Academy of Science, the *Kansas University Quarterly,* and the University Geological Survey of Kansas; also three volumes on the "Cretaceous Fishes" in cooperation with Alban Stewart; and "Paleontology (Upper Cretaceous)," Part I., Volume IV., of the University Geological Survey, which was chiefly prepared by Williston with the assistance of his students Adams, Case and McClung, and is a thorough review of the geology and marine fauna of the Cretaceous seas, containing the first clear distinctions and restorations of the great Kansas mosasaurs, *Clidastes,*

[4] These notes on Williston's work on fossil reptiles and amphibians have been prepared in collaboration with Professor W. K. Gregory of the American Museum of Natural History.

Platecarpus and *Tylosaurus*. This work became the standard for all subsequent researches of Osborn, Wieland and others on the Cretaceous fauna. It contains some admirable restorations of mosasaurs and other fossils which may be compared with those of Dollo from the Maestrichtian of Belgium. The second part, Volume VI. of the University Geological Survey, covering the Carboniferous and Cretaceous, published in 1900, included the Cretaceous fishes alluded to above, and the Carboniferous invertebrates by Joshua W. Beede.

Williston concluded his studies of the Cretaceous fauna during the early years of his professorship in Chicago, beginning in 1902. Thus his work on the Kansas Cretaceous fauna, following the very disjointed contributions of Leidy, Marsh and Cope based on inferior material, marks the turning-point in this field to the new order of description and generalization based upon complete material, including even the skin impressions of several great mosasaurs. In his observations on the mosasaurs, plesiosaurs, pterodactyles and marine turtles, and the birds with teeth, *Odontornithes*, he placed the osteology of these several animals on a much more secure basis, adding a number of new generic types, such as a short-necked plesiosaur, *Dolichorhynchops osborni*.

His first contribution to the phylogeny and classification of the Reptilia as a whole appeared in 1905 and was followed by his important discussion of this subject entitled "The Phylogeny and Classification of Reptiles," *Journal of Geology*, August, 1917. In this article, which expresses his mature opinions, he departed from his previous conservative attitude towards classification and proposed to add two subclasses of reptiles, the Anapsida and the Parapsida, to the subclasses previously proposed by Osborn, namely, the Synapsida and the Diapsida, making a fourfold grand division of the Reptilia. Doubtless it was Williston's intention to fortify this system of classification in his forthcoming general work on the Reptilia.

WORK ON PRIMITIVE AMPHIBIANS AND REPTILES[5]

In 1902, at the age of fifty, Williston was called to the University of Chicago as head of the new department of vertebrate paleontology, a chair which he occupied with great distinction and with continued influence for the remaining sixteen years of his life. He now began to concentrate his attention more exclusively on vertebrate paleontology. During the first six years he continued his studies and publications on the Cretaceous reptiles; then he began to turn towards the study of far more difficult and obscure problems, namely, the relatively primitive amphibian and reptilian life of the Permian, where in several groups he marked the beginnings of the higher forms which he had previously studied, as well as the adaptive radiation of the lower forms to a great variety of habits and habitats.

In 1911 he published from the University of Chicago Press his volume, "American Permian Vertebrates," which comprises a series of monographic studies on some of the genera already noted. This work contains many new and original plates. His principal publication in 1914 was the book on "Water Reptiles of the Past and Present," in which his life-work on these animals was admirably combined with the results obtained by other workers. Williston had shown a bent for the harmonious study of form and function, of structure and habit, of environment and adaptation, which he applied with skill and originality to the interpretation of the highly diversified forms of aquatic life. He followed Eberhard Fraas of Stuttgart in making a special study of aquatic adaptations in the vertebrates; consequently his book on the water reptiles constitutes one of the most important contributions which we have on this subject. In 1917 he began a general work on the "Reptiles of the World, Recent and Fossil," upon which he was actively engaged up to his last illness; also the publication of his papers on *Edaphosaurus*, on the atlas-axis complex of reptiles, and, equally important, his brief

[5] See footnote, p. 276.

paper on the "Phylogeny and Classification of Reptiles," previously mentioned. During the last two years of his life he was also preparing a paper on new Permian reptiles. It is a matter of the deepest regret to all of Williston's colleagues in paleontology that he did not live to complete his great comparative work on the Reptilia, which would have summed up all his researches and observations and the facts stored in his mind which have never found their way into print.

A few of the more general features of Williston's life-work and character are as follows: He strove arduously through forty years of investigation to discover new material in the field and to widen our basis of facts in several distinct lines of investigation; he preferred to discover new facts rather than to reinterpret older ones or to adjust the interrelations of facts; in general, his material was notably of his own finding. Nevertheless, especially in his late years, he labored very successfully to classify and synthetize his material, and with it that which had been treated by other workers. Here his genial personal character and admirable relations with his colleagues shone forth; he was singularly appreciative of the work of other men and ready to adopt whatever he believed to be solid and enduring in previous attempts at classification. Thus Williston's work stands in contrast with that of Cope and Marsh, whose personal differences of opinion led to the setting up of two entirely distinct systems of classification as well as of nomenclature, irrespective both of priority and of merit. Williston's keen, broad knowledge of human anatomy, of the muscles as well as of the bones, doubtless aided his penetrating insight into the habits of the extinct animals, and while generally conservative and cautious, his phylogenetic studies and suggestions were of high value. His views on taxonomic standards[6] and on college and high-school education[7] were, like his views on paleontologic problems, characteristically sober, moderate and well considered, lighted up in their expression with his genial, half-humorous manner. He was ready to confess and appraise defects or faults on his own side, but quick to resent exaggerated accusations and criticisms from the other side.

His friends and colleagues met him last at the Pittsburgh meeting of the Paleontological Society of America, December 30, 1917, and enjoyed a few of his short and characteristically enthusiastic communications and discussions. With Dr. Holland, myself and many other warm friends he stayed the old year out and saw the new year in at the society smoker. He returned home quite suddenly, and this was the last occasion on which we were privileged to enjoy his genial presence, his humorous narratives, and his inspiring influence in paleontology.

Henry Fairfield Osborn
The American Museum of Natural History,
February 21, 1919

[6] "What is a Species," *Amer. Nat.*, XLII., 184–94.

[7] "Has the American College Failed to Fulfill Its Function?" *Proc. Nat. Educ. Assn.* (1909), p. 526.

SCIENTIFIC EVENTS

THE BRITISH MINISTRY OF HEALTH BILL

The text of the Ministry of Health Bill, presented to the House of Commons on February 17, has since been published. According to *Nature* the bill differs little from the measure originally presented to the last Parliament. That it does differ to some extent, however, particularly in bearing signs of having been worked at and polished, is worthy of mention. The new bill carries the stamp of finality, and suggests that most of the State Departments performing health functions—the Local Government Board, the Board of Education, and the Insurance Commissioners especially—have arrived at arrangements more or less agreeable to all parties. The position as between the two first-named, for example, is shown to be fairly easy. Even as regards the place to be taken by the Insurance Commissioners, there is less reason for dissatisfaction, and concessions no doubt have been made by the various bodies and individuals concerned. Speaking generally, the measure

is a hopeful one, and inspired the feeling that we are well on the way to the establishment of the Ministry. The tone adopted by Dr. Addison is significant of this also, as is the translation of Sir George Newmann to the Local Government Board, and the granting to him of the title of "chief medical officer," with the status of a secretary of the board.

Nature continues: "One part of the bill which has been carried over unaltered from its predecessor is that relating to the appointment of consultative committees, and Dr. Addison, by his utterances, has shown himself to be firmly wedded to this idea, and expectant of results of great value from the work to be done by these bodies. The Consumers' Council at the Ministry of Food, which may be regarded as more or less analogous, though it was occasionally sneered at, must have assisted the food controller considerably. There is no reason to suppose that the Ministry of Health consultative committees will be any less helpful. Indeed, since they are to consist of carefully selected experts on matters having a bearing on national health, they are almost bound to be more valuable. In any event, the consultative committee idea has this to recommend it: that it will popularize health work. The committees will serve as a most effective link between the department doing the work and those for whose benefit the work is done. The department and the workers will be less cloistered; the workers and those who are worked for will be more intimately associated. The public will see and hear of what is being done, and will come to recognize the necessity for assisting in, and taking advantage of, the efforts made. So far there have been remarkably few comments on the bill, but on the whole the reception has been entirely favorable."

THE COLLEGE OF FISHERIES AT THE UNIVERSITY OF WASHINGTON, SEATTLE

THE College of Fisheries just established by the University of Washington, at Seattle, enjoys the distinction of being the only one in the world outside of Japan. The Imperial Fisheries Institute at Tokio is a government institution and has been in existence since 1897. It has so conclusively proved its worth that a number of subsidiary schools have been established in the various provinces of Japan.

When the matter of the establishment of a College of Fisheries in this country was first broached by Dr. H. M. Smith, U. S. Commissioner of Fisheries, his attention was called to the fact that Seattle is the only American city within whose corporate limits, or in territory immediately adjacent, can be found in active operation practically every type of plant used in turning the raw fishery material into all forms of manufactured articles both for food and for use in the arts and sciences; fishery operations were carried on even in Seattle harbor; while the great salmon, halibut, cod and herring fleets operating in Alaska waters had their headquarters mainly in the city, outfitting there and bringing back the products for shipment to all parts of the world; also that one of the leading universities of the country was already established there and could take up the work.

The College of Fisheries will offer a four-year course divided into three divisions—Fishing, Technological and Fish Cultural. Students will be given as much practical training as possible in the college, but for certain periods in the last two years of the course will be expected to pursue their studies by work in commercial establishments devoted to the preparation of fishery products, aboard fishing vessels, or at hatcheries.

As the university is a state institution, an important part of the work of the College of Fisheries will be in rendering assistance and advice whenever called upon by the state authorities, and also to aid the commercial fishermen not only of the state but of the nation in solving the many problems which beset them, and to aid in the conservation and perpetuation of our wonderful fishery resources. Research work along the lines of utilization of hitherto neglected species, and of waste products, will be carried on and it is hoped will result in materially increasing the wealth of the state and nation.

The director, Mr. John N. Cobb, who is also

professor of fisheries, is known in connection with the economic fisheries of the United States, and has been active in the industry since 1895, when he was appointed a field agent of the U. S. Bureau of Fisheries.

BUFFALO MEETING OF THE AMERICAN CHEMICAL SOCIETY

THE spring meeting of the American Chemical Society will be held with the Western New York Section in Buffalo, April 7 to 11, inclusive. There is every prospect that the meeting will be one of the largest ever held by the American Chemical Society as unusual interest has developed in problems of reconstruction, in the future utilization of war-time products, in heretofore secret information on chemistry warfare that can now be released, in the development of a comprehensive compendia of the literature of chemistry, and in many other problems which the Buffalo meeting will consider. A large number of chemists who have already signified their intention to be present assures also an unusual opportunity for meeting and discussing chemical problems with chemists who have been closely in touch with the nation's affairs. The Western New York Section is making arrangements for interesting excursions to industrial plants of importance.

Registration will take place at the Hotel Statler beginning at 3 P.M., Monday, April 7. An information bureau will be located at the hotel, and competent guides placed at all railroad stations. The general program is as following:

MONDAY, APRIL 7

4.00 P.M.—Council meeting at the University Club. Dinner for the council as guests of the Western New York Section at 6.30 P.M.

TUESDAY, APRIL 8

9.30 A.M.—General Meeting, Hotel Statler. "The Future of American Chemical Industry," by Wm. H. Nichols, President American Chemical Society.

One other general address to be announced.

2.30 P.M.—General Symposium on the Chemistry and Technology of Mustard Gas. Wilder D. Bancroft, chairman. Numerous interesting papers are offered. These will take up the whole of the afternoon of Tuesday and may continue on Wednesday morning in the Biological, Physical and Inorganic, and Organic Divisions.

8.15 P.M.—Smoker, Hotel Statler.

WEDNESDAY, APRIL 9.

Divisional meetings—9.30 A.M., 1 P.M. and 2.30 to 5.30 P.M., at Technical High School.

6 P.M.—Dinner to Council at Canisius College.

8.30 P.M.—At Hutchinson High School—Public Address, "A Chemical Story," by Edgar F. Smith, Provost of the University of Pennsylvania.

THURSDAY, APRIL 10

9.30 A.M. to 1 P.M.—Divisional meetings.

2 P.M.—Excursion. National Aniline & Chemical Company.

7 P.M.—Banquet—place to be announced. The capacity of the hall requires that only 400 tickets be issued.

The usual meetings will be held by all the Divisions except the Fertilizer Division, and by the Rubber Chemistry Section, with the following special program: The Division of Industrial Chemists and Chemical Engineers will make a special effort on papers on the probable future of those chemicals which have been abnormally stimulated during the war and on the library of the industrial laboratory. The Pharmaceutical Division announces a symposium on "The Possibilities in Drug Research." The Rubber Chemistry Section will apply for permission to organize at this meeting as a division.

Excursions are being arranged to include the works of the Buffalo Foundry and Machine Company; J. P. Devine and Company; Larkin Company; Municipal Laboratories and Water Purification Works; Oil Crushers; Pratt and Lambert, varnish makers; Spencer Kellogg Company; and tour of the city. Also, excursion to Niagara Falls, including visit to Power Plant, luncheon at Chamber of Commerce, pictures and exhibits of Niagara Falls products, drive along the Gorge and visit to Canadian side and Victoria Park. To accomplish the full program of excursions, it may be necessary to arrange for part of these excursions on Saturday.

SCIENTIFIC NOTES AND NEWS

THE annual meeting of the National Academy of Sciences will be held at the Smithsonian Institution in Washington on April 28, 29, and 30. The William Ellery Hale Lecture will be given by James Henry Breasted, professor of Egyptology and oriental history, University of Chicago, on "The Origin of Civilization."

COLONEL HARVEY CUSHING, of the Harvard Medical School, has returned to the United States.

LIEUTENANT-COLONEL J. H. HILDEBRAND, who has recently been Commandant of Hanlon Field, near Chaumont, France, which included the Experimental Field and the A. E. F. Gas Defense School of the Chemical Warfare Service, has returned after an absence of a year in France to his position of professor of chemistry in the University of California.

MAJOR C. B. STANTON, formerly professor of civil engineering at the Carnegie Institute of Technology, who has been with the 15th Engineers in France for nearly two years, has notified the dean of the Science School that he has been appointed a professor in the American University for American soldiers at Beaune, France. Major Stanton was with his regiment at Bordeaux awaiting orders to board a transport and come home when he received the unexpected order of reporting to this "soldier university" as professor of civil engineering.

MAJOR WILLIAM B. HERMS, associate professor of parasitology in the University of California, has resumed his university duties. Major Herms has been serving with the Sanitary Corps of the U. S. Army for a little over a year, stationed since April, 1918, at the port of embarkation, Newport News, Va., where he was in charge of malarial drainage operations, delousing stations and assisting in general sanitary inspection.

PROFESSOR FRANK E. MORRIS has returned to the Connecticut College for Women as professor of psychology and ethics, which position he left last year when he enlisted in the psychological department of the Sanitation Corps of the Army.

LIEUTENANT A. C. CHANDLER, assistant professor of zoology at the Oregon Agricultural College on leave of absence, has been ordered to the front with the American soldiers to make a study of rat parasites in France.

DR. LIVINGSTON FARRAND, chairman of the central committee of the American Red Cross, sailed for France on March 9, to be gone until the latter part of April. Having set in motion at headquarters the plans for the future of the Red Cross, Dr. Farrand goes abroad to study the organization's problems in Europe, and to confer with Henry P. Davison, formerly chairman of the war council, who is now at Cannes arranging for the international conference of Red Cross societies called to meet at Geneva 30 days after the declaration of peace. Dr. Farrand has arranged to have a number of American health experts join him at Cannes for the purpose of conferring with similar experts from the allied countries relative to matters that are to be taken up at Geneva.

DR. T. A. HENRY, superintendent of the laboratories at the Imperial Institute, London, has been appointed director of the Wellcome Chemical Research Laboratories, London. Dr. F. L. Pyman, the former director of these laboratories, has accepted the professorship of technological chemistry in the College of Technology, University of Manchester.

DR. H. C. TAYLOR, of the University of Wisconsin, has been appointed to be chief of the office of farm management of the Department of Agriculture.

PROFESSOR WILLIAM D. HURD, director of the Massachusetts Agricultural College, has resigned and will enter the service of the National Fertilizer Association. He is to have charge of educational projects in the middle west. Professor Hurd undertook the organization of the state system of extension work in 1909. There are now twenty full-time workers at the college engaged in projects of food production, distribution and conservation.

DR. ARTHUR LACHMAN, formerly professor of chemistry in the University of Oregon, is

now connected with the Great Western Electro-Chemical Co., San Francisco, Cal.

The annual meeting of the District of Columbia Chapter of the Society of the Sigma Xi was held in the auditorium of the National Museum, on March 6. Major R. M. Yerkes, Sanitary Corps, U. S. Army, gave an illustrated lecture on the "Relationship of Army Mental Tests to Education and Vocational Guidance." Officers for the ensuing two years were elected as follows: *President,* C. L. Shear; *Vice-president,* H. L. Shantz; *Secretary,* M. W. Lyon, Jr.,; *Treasurer,* D. Roberts Harper 3d; *Councillors,* Charles E. Tullar and C. A. Briggs.

A Canadian branch of the American Phytopathological Society was recently organized. The purpose of the organization is to correlate the work of plant pathologists in Canada and keep them in closer touch with each other, at the same time retaining a close union with the plant pathologists in the United States. The officers are: Professor J. E. Howitt, *president;* Mr. W. A. McCubbin, *Vice-president;* Dr. R. E. Stone, *Secretary-treasurer.*

The following officers and council of the Royal Astronomical Society were elected at the annual general meeting on February 14: *President:* Professor A. Fowler; *Vice-presidents:* Sir F. W. Dyson, Astronomer Royal, Dr. J. W. L. Glaisher, Major P. A. MacMahon, and Professor H. F. Newall; *Treasurer:* Mr. E. B. Knobel; *Secretaries:* Dr. A. C. D. Crommelin and Rev. T. E. R. Phillips; *Foreign Secretary:* Professor H. H. Turner; *Council:* Professor A. E. Conrady, Dr. J. L. E. Dreyer, Professor A. S. Eddington, Brig.-Gen. E. H. Hills, Mr. J. H. Jeans, Dr. Harold Jeffreys, Mr. H. S. Jones, Lieutenant-Colonel H. G. Lyons, Mr. E. W. Maunder, Dr. W. H. Maw, Professor J. W. Nicholson, and Lieutenant-Colonel F. J. M. Stratton.

We learn from *The British Medical Journal* that a House of Commons Medical Committee has been formed to include all medical members and other members of the House of Commons interested in scientific matters akin to medicine. All the medical members, excepting the ministers, have joined, and also Sir Philip Magnus (member for the University of London) and Sir Henry Craik (one of the members for the Scottish Universities). The chairman is Sir Watson Cheyne, and the secretary Major A. C. Farquharson. The executive committee consists of Sir William Whitla, Lieut.-Colonel Nathan Raw and Captain Elliott. The objects of the committee are to exchange opinions so as to secure representation of agreed views on medical subjects in Parliament. The committee is open to receive representations on all such matters from the colleges and corporations, and from societies and associations, and will hold conferences when considered desirable. It will not allow itself in any way to be identified with any one particular body. A subcommittee has been appointed, consisting of Colonel Nathan Raw (England), Sir Watson Cheyne (Scotland), and Sir William Whitla (Ireland), to watch the ministry of health in its progress through the House.

Dr. H. D. Curtis, of the Lick Observatory, Mount Hamilton, California, gave an address on "Modern Theories of Spiral Nebulæ" at a joint meeting of the Washington Academy of Sciences and the Philosophical Society of Washington on March 15.

The death is announced on February 19, at eighty-five years of age, of Dr. F. Du Cane Godman, F.R.S., trustee of the British Museum, and distinguished for his work in natural history, especially ornithology.

An item concerning the "Goodrich conservation bill," printed on page 213 of Science for February 10, applies to the state of Indiana, and not to Illinois.

Malcolm Playfair Anderson, a well-known naturalist and explorer, was killed in Oakland, California, on February 21, by the fall of a beam in a shipyard. Mr. Anderson was a graduate of Stanford University, a son of Dr. Melville Best Anderson, professor emeritus of English literature at Stanford. He was an accomplished ornithologist, his work having been largely in China and Japan, where he was head naturalist of the Duke of Bedford's ex-

plorations in Eastern Asia. He was brother of Robert V. Anderson, late of the U. S. Geological Survey, now representing the War Trade Board at Stockholm.

UNIVERSITY AND EDUCATIONAL NEWS

BY the will of the late Morton F. Plant, the Connecticut College for Women receives a bequest of $250,000.

Two years ago Professor and Mrs. Herdman gave to the University of Liverpool, the sum of £10,000 to establish a chair in memory of their son, Lieutenant George A. Herdman, who was killed in action. *Nature* states that they have now made a further gift of £10,000 for the purpose of establishing a chair of oceanography with special reference to fisheries. The council of the university has accepted this gift with grateful thanks, and has resolved that (1) Professor Herdman be appointed professor of oceanography as from October 1 next; (2) Dr. J. Johnson succeed him on October 1, 1920, and during the twelve months from October 1 next be lecturer on oceanography at the salary derived from the endowment.

THE senate of the University of Cambridge has approved the plan for the establishment of the degree of doctor of philosophy. The syndicate dealing with this question recommends that, subject to certain exemptions, candidates for the degree, before submitting a dissertation, must have pursued a course of research for not less than three years, and the senate has determined that of this period one year in the case of a graduate of the university and two years in the case of other students must be spent in Cambridge.

SIR OLIVER LODGE has retired as principal of Birmingham University.

THE resignation of Dr. Harry B. Hutchins, as president of the University of Michigan, which was presented on October 12, 1916, has now been accepted by the regents to take effect on June 30. It is reported that Dr. James Rowland Angell, professor of psychology and dean of the department of arts and sciences of the University of Chicago, will be asked to accept the presidency.

DR. JOHN JOHNSTON, secretary of the National Research Council in Washington, has been appointed professor of chemistry in the Graduate School of Yale University. Professor Johnston is a graduate of the University of St. Andrews.

LIEUTENANT KARL SAX, recently discharged from military service in the coast artillery at Fort Amador, Canal Zone, Panama, has been appointed instructor in genetics at the University of California.

DISCUSSION AND CORRESPONDENCE

DESMOGNATHUS FUSCUS (SIC).

TO THE EDITOR OF SCIENCE: Professor Wilder's letter recalls a proposal made by Mr. Oldfield Thomas and myself, a proposal worth repeating. Zoological nomenclature has many inevitable difficulties to overcome, and it will save time and disputes if there be removed from it the extrinsic burden of trying to conform with the rules of Greek and Latin grammar. Let the convention be established that the name of a genus, whatsoever its derivation, be regarded as masculine when the genus denotes a group of living animals, feminine if it denote a group of living plants, and neuter if it denotes a fossil animal or plant. Let it be agreed that the scientific name of an existing species may be changed to accord with this conventional sex where possible, and that in the making of new names, the accord should be made by the author, corrected by the editor or by any subsequent writer. This would simplify matters and, in a considerable proportion of instances would give useful information.

P. CHALMERS MITCHELL
ZOOLOGICAL SOCIETY OF LONDON

TO THE EDITOR OF SCIENCE: I have read with interest and some amusement the letter by Mr. H. H. Wilder, on "Desmognathus fuscus [sic]." It seems to me to lend additional support to the suggestion made years ago by my friend, the Rev. T. R. R. Stebbing, that

all zoological generic names should be regarded as masculine. I enclose herewith a copy of his article on the subject: perhaps you could quote some portions of it in SCIENCE in order to remind the zoological world of an eminently reasonable proposal.

WM. EVANS HOYLE
NATIONAL MUSEUM OF WALES

My suggestion is that a technical specific name in Zoology should be released from the obligation of agreeing with the supposed gender of the generic name to which it is attached.

Simplicity would be attained by acceptance of the convention that in zoology a generic name, whatever its termination, is to be regarded as of the masculine gender.

That some scholarly ear might occasionally be offended, is a minor disadvantage compared with the general utility of the convention. A famous historical character was hailed as "our king Maria Theresa," without any influence on the actual sex of that distinguished person. Similarly many men have been named Maria without in consequence becoming women or in any degree effeminate. The termination of a generic name is a very indifferent reason for determining a zoological species as either masculine, feminine, or neuter, seeing that the species itself usually includes two of the genders, and sometimes all three. Very commonly all the normal individuals of a species are either of the male or female sex. Yet, under the existing rule, the species must sometimes have a neuter name, as though it referred to something inorganic or of undiscriminated sex. Such considerations, however, are of subordinate importance compared with the troublesome character of the present arrangement. As every one is aware, it repeatedly happens that by accessions to knowledge, genera become unwieldy and have to be subdivided. The new names, it may be, do not agree in gender with the old, and then the transferred species must all have their terminations altered. But, apart from this consequential trouble, naturalists for ages past have found the determination of generic genders a stumbling-block. How much more is this likely to be the case in the future, with the continuous decline of classical studies! Without actual examples, few would credit the difficulties encountered and the errors committed by naturalists in their endeavors to comply with the existing rule or practise.—T. R. R. Stebbing in *Knowledge* (1910).

HAY FEVER AND THE NATIONAL FLOWER

TO THE EDITOR OF SCIENCE: The attention of the American Hayfever Prevention Association has been called to the article on "Hay Fever and the National Flower" in a recent issue of your journal.

The research department of this association, which was established in 1915, has made a thorough investigation of the causes of hay fever, being assisted in this work by specialists and botanists in practically every state of the union. The pollens of all the most common plants and trees have been tested and their relation to hay fever established.

Generally speaking, the principal causes of fall hay fever in the northern, eastern and southern states[1] are the pollens of the ragweeds (Ambrosiaceæ), these being replaced in the Pacific and Rocky Mountain States[2] by the wormwoods (artemisias) The chief causes of spring hay fever are the pollens of the grasses in all sections. About five per cent. of hay fever cases are due to other pollens. The golden rod, however, is not included in these, having proven a clear "alibi."

For those not already familiar with the subject, the following statement is made:

THE GOLDEN ROD IS NOT RESPONSIBLE FOR HAY FEVER

1. It does not conform to the description of hay fever plants, which is as follows:[3] (1) They are wind-pollinated, (2) very numerous, (3) the flowers are inconspicuous, without bright color or scent, and the pollen is formed in great quantities. The flowers of the golden rod are insect-pollinated, have bright colors and scent, and the pollen is not formed in large quantities.

[1] "Hayfever: Its Cause and Prevention," W. Scheppegrell, M.D., *Journal of the American Medical Association*, March 4, 1916.

[2] "Hayfever: Its Cause and Prevention in the Rocky Mountain and Pacific States," W. Scheppegrell, M.D., United States Public Health Reports, July 20, 1917.

[3] "Hayfever and Its Prevention," W. Scheppegrell, M.D., United States Public Health Reports, July 21, 1916.

2. The golden rod continues to bloom for several weeks after the hay fever season is over.[4] In western North Carolina, for instance, the hay fever season concludes about October 1, but the Canadian golden rod (*Solidago canadensis*) brightens the autumn landscape until November. In our hay fever clinic at the Charity Hospital of New Orleans, the fall hay fever season concludes about October 26, but the golden rod continues to bloom until December.

3. Our research department exposes its atmospheric-pollen-plates in various parts of the United States, and in this way, the atmospheric-pollens are caught and examined. The pollens of the golden rod are never found on these plates, proving that this pollen is not atmospheric. Unless the pollen is in the air, as in the cases of the ragweeds, grasses and other wind-pollinated plants, it can not cause hay fever unless the nostrils are applied directly to the flower, or are used in large quantities for room decorations, in which case the pollen may fall within the limited space.

The pollen of the golden rod may cause a reaction when applied directly to the nostrils, or when used in large quantities for room decorations. As far as being a cause of hay fever, however, it is absolutely negligible. It is one of our most beautiful flowers, and well merits its selection as the national flower of the United States.

W. SCHEPPEGRELL

AMERICAN HAYFEVER PREVENTION ASSOCIATION; CHIEF OF HAYFEVER CLINIC, CHARITY HOSPITAL; EX-PRESIDENT AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

SCIENTIFIC BOOKS

Manual of Meteorology, Part IV. *The Relation of the Wind to the Barometric Pressure.* By SIR NAPIER SHAW, Cambridge, University Press. 1919.

The British Meteorological Office during the past four years has been called upon to answer a good many questions put to them by the Army, Navy and Air Services. The requests for detailed information regarding wind, weather and the structure of the atmosphere were numerous and urgent. For in both offensive and defensive operations the military authorities suddenly realized how all important a knowledge of aerography was. In attempting to give definite data, Sir Napier Shaw, as Scientific Advisor to H. M. Government and chairman of the Meteorological Committee, says that he found as a guiding principle of great practical utility, the relation of the wind to the distribution of pressure. The underlying assumption is that the flow of air in the free atmosphere follows very closely the laws of motion under balanced forces, depending upon the *spin* of the earth and the *spin* in a small circle on the earth.

There are eleven chapters in the book. The opening chapters give details of the determination of the pressure gradient and the wind. Land and sea relations of surface wind to the gradient, turbulence in relation to gustiness and cloud sheets, eddy clouds, the dominance of the stratosphere, coastal refraction of isobars and the dynamical properties of revolving fluid in the atmosphere, are treated in some detail in successive chapters.

Space permits of but one quotation from the book and that is almost the last paragraph; but here the author drives another nail in the coffin of the convectional theory of the cause of cyclones.

> It has long been supposed that the variations of temperature at the surface are themselves the cause of the original circulation of the cyclone, but it is much more easy to explain convection along the core as the effect of an existing circulation above, than *vice versa*, and there are so many examples of convection attended even by copious rainfall which produce no visible circulation that it is difficult to regard convection from the surface as a sufficient cause of our numerous depressions.

Sir Napier deals at some length with the relation between the surface wind and the geostrophic wind at sea-level. This is pecul-

[4] "Susceptibility to Hayfever, and Its Relation to Heredity, Age, and Seasons," W. Scheppegrell, M.D., United States Public Health Reports, July 19, 1918.

iarly his own field, and is in fact a development of the past six years. It is a distinctive contribution of the British school of aerographers. We may explain that the balance between pressure and velocity of air flow, or what is known as the strophic balance, leads to an equation for the gradient wind of the following form:

$$s = 2\omega v\rho \sin\phi \pm v^2\rho \cot r/E$$

The first term in the right-hand member of the equation represents velocity due entirely to the earth's rotation and hence is known as the geostrophic wind. The other is known as cyclostrophic. Only a few months ago J. S. Dines called attention to a rather remarkable outcome of this equation, where in the case of a path concave to the "low," velocities of the order of $6m/s$ for normal counter-clockwise rotation, and $46m/s$ for rotation in the opposite direction, appear to be possible. Thus a depression revolving with high speed in a *clockwise* direction in the northern hemisphere is dynamically possible. There are reasons why such an eddy on a large scale might not be established or last long, but small area eddies such as those around high buildings, etc., evidently can be set up with rotation either clockwise or anti-clockwise. This raises the question, How often are dust-whirls, tornadoes, and waterspouts observed with a clockwise rotation?

Sir Napier Shaw uses as a frontispiece a chart showing paths of the centers of some notable cyclonic depressions of long duration. One is the path of a *baguio* traced by McAdie from lat. 15° N. in the western Pacific, starting on November 20, 1895, and reaching the Oregon-California coast January 12, 1896, a rather definite duration of 54 days at sea and a probable history of 4 days more in the United States and 5 days over the North Atlantic. Two other long duration storm paths are given.

These paths of long duration are significant in connection with origin, directive force and persistence of structure of cyclones and anticyclones. The most pressing question to-day before aerographers is accurate knowledge of the driving forces of a depression, and the directive resultant. There can be no accurate forecasting without this knowledge.

We are promised three more volumes from the University Press; one, a general survey of the globe and its atmosphere. A second on the physical properties of the atmosphere, and a third, a formal exposition of the dynamics and thermics of the atmosphere.

Sir Napier Shaw is to be congratulated not only on the output from his own industrious pen, but upon what he has accomplished in stimulating the young men around him, Lempfert, Dines, Gold, Cave, Taylor and others.

A. M.

THE NATIONAL ACADEMY OF SCIENCES

The eleventh number of Volume 4 of the *Proceedings of the National Academy of Sciences* contains the following articles:

The "Homing Habits" of the Pulmonate Mollusk Onchidium: Leslie B. Arey and W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. *Onchidium floridanum* lives during high tide in "nests," *i. e.*, rock cavities, containing a number of individuals. The individuals leave the nest in low water to feed, and return simultaneously to it before the tide rises again, giving evidence of homing behavior.

Growth and Duration of Life of Chiton Tuberculatus: W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. The growth curve is obtained on the assumption that the age of a chiton may be estimated from the growth-lines upon its shell. The mean duration of life is probably a little less than eight years.

Growth of Chiton Tuberculatus in Different Environments: W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. Growth curves obtained under different conditions are compared.

The Interferometry of Vibrating Systems: C. Barus, Department of Physics, Brown University. The high luminosity of the achromatic interferences and the occurrence of but

two sharp fringes make it possible to utilize them even in cases when the auxiliary mirrors vibrate. The vibration interferometer is quite sensitive, provided the average currents are of the order of several microamperes.

On the Essence of Physical Relativity: Sir Joseph Larmor, Cambridge, England. A general discussion of the physics underlying relativity, with particular reference to an article by Leigh Page.

Gravitational Attraction in Connection with the Rectangular Interferometer: Carl Barus, Department of Physics, Brown University. The rectangular interferometer is so sensitive in the measurement of small angles that it may be used for the measurement of the Newtonian constant of gravitational attraction.

The General Character of Specific Heats at High Temperatures: Walter P. White, Geophysical Laboratory, Carnegie Institution of Washington. The general law covering the behavior of atomic heats from the lowest temperatures up demands that at sufficiently high temperatures all atomic heats at constant volumes should have the value 5.96. A contrary hypothesis has been made, namely, that atomic heats continue to increase with the temperature. The substances here examined give evidence that the atomic heats do increase above the value 5.96.

On Certain Projective Generalizations of Metric Theorems, and the Curves of Darboux and Segre: Gabriel M. Green, Department of Mathematics, Harvard University. The continuation of earlier work by the same author in the *Proceedings.*

The Rectangular Interferometer with Achromatic Displacement Fringes in Connection with the Horizontal Pendulum: Carl Barus, Department of Physics, Brown University.

THE twelfth number of Volume 4 contains the following articles:

The Absorption Spectrum of the Novae: W. S. Adams, Mount Wilson Observatory, Carnegie Institution of Washington. A discussion of Nova Aurigæ of 1892, Nova Persei of 1901, Nova Geminorum of 1912, and Nova Aquilæ of 1918. The displacements of the lines in all these stars are directly proportional to wavelengths, and divide themselves into two pairs of equal amount. Of these the first pair of stars has exactly twice the displacement of the second. In the case of Nova Aquilæ, there is a progressive increase in the values of the displacements of the absorption lines at successive dates. Various hypothetical explanations are discussed.

On Jacobi's Extension of the Continental Fraction Algorithm: D. N. Lehmer, Department of Mathematics, University of California. A closer study of Jacobi's expansion reveals a number of remarkable points. Six theorems are stated.

A Characterization of Jordan Regions by Properties having no reference to their Boundaries: Robert L. Moore, Department of Mathematics, University of Pennsylvania. The theorem is proved: In order that a simply connected, limited, two-dimensional domain R should have a simple closed curve as its boundary it is necessary and sufficient that R should be uniformly connected im kleinen.

A Biometric Study of Human Basal Metabolism: J. Arthur Harris and Francis G. Benedict, Nutrition Laboratory and Station for Experimental Evolution, Carnegie Institution of Washington. An analysis of measurements on 136 men, 103 women, and 94 new-born infants.

Sex and Sex Intergrades in Cladocera: Arthur M. Banta, Station for Experimental Evolution, Carnegie Institution of Washington. The presentation of facts in regard to *Cladocera,* with the discussion of their significance with regard to sex intergrades in general, leading to the tentative conclusion that sex is always relative and that while most individuals of whatever species are prevailingly male or prevailingly female, every individual may have something of the other sex intermingled with its prevailing sexual characters.

On the Method of Progression in Polyclads: W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. In turbellarians generally, muscular operations analogous to those executed by the foot of chitons

and of gastropods are essentially concerned in creeping locomotion.

The Phylogeny of the Acorn Barnacles: Rudolf Ruedemann, State Museum, Albany, N. Y. The derivation of an *Eobalanus* from a *Rhinocaris*-like phyllopod is illustrated in a set of diagrams.

Possible Derivation of the Lepadid Barnacles from the Phyllopods: John M. Clarke, State Museum, Albany, N. Y. So far as present knowledge extends, the metamorphoses of the phyllopods into the two great branches of the barnacles were essentially contemporaneous.

Refractive Index and Solubilities of the Nitrates of Lead Isotopes: Theodore W. Richards and Walter C. Schumb, Wolcott Gibbs Memorial Laboratory, Harvard University. The difference in atomic weight of the lead (207.20 and 206.41) has no appreciable effect on the refractive index or on the molal solubility of the different samples of lead nitrate.

The Purification by Sublimation and the Analysis of Gallium Chloride: Theodore W. Richards, W. M. Craig and J. Sameshima. Wolcott Gibbs Memorial Laboratory, Harvard University. The method rests on the fact that gallium trichloride sublimes and distils at a low temperature, whereas the other chlorides likely to be associated with it are much less volatile.

The Purification of Gallium by Electrolysis, and the Compressibility and Density of Gallium: Theodore W. Richards and Sylvester Boyer, Wolcott Gibbs Memorial Laboratory, Harvard University. The method of separating gallium from indium by means of the different solubilities of the hydroxides in caustic alkali was tested without success; much more promising results were obtained by the electrolytic method. The compressibility of solid gallium was found to be 2.09×10^{-6}, and of liquid gallium 3.97×10^{-6}, nearly twice as great, although its volume is less. The density of the liquid was 6.081, and of the solid 5.885.

The Growth-rate of Samoan Coral Reefs: Alfred G. Mayor, Department of Marine Biology, Carnegie Institution of Washington. the growth rate of *Acropora, Porites, Pocillopra, Pavona, Psammocora* are given; and the weight of limestone added per year to the upper surface of the Aua reef-flat is estimated as 805,000 lbs. Other similar estimates are given.

The Distances of Six Planetary Nebulæ: Adriaan van Maanen, Mt. Wilson Solar Observatory, Carnegie Institution of Washington. The nebulæ N.G.C. 2392, 6720, 6804, 6905, 7008 and 7662 are examined. The parallaxes range from 0."002 to 0."021, and the diameters from 10,000 to 1,350 astronomical units.

National Research Council: Minutes of the Meeting of the Executive Board, July 9, August 13, September 9 and October 8.

We may summarize the articles in Volume 4 of the Proceedings as follows: Mathematics, 9; Astronomy, 11; Physics and Engineering, 25; Chemistry, 5; Geology and Paleontology, including Mineralogy and Petrology, 9; Botany, 3 (see also Genetics); Zoology, including General Biology, 12 (see also Genetics); Genetics, 6; Physiology and Pathology, 10; Anthropology and Psychology, 1; a total of 91 articles.

The division of these articles between members of the Academy and non-members is 39 and 52 respectively.

The list of institutions which have contributed three or more articles is as follows: Carnegie Institution, 15, divided as follows: Solar Observatory, 7, Nutrition Laboratory, 4, Geophysical Laboratory, 1, Marine Biology, 1, Station for Experimental Evolution, 1, Tortugas Laboratory, 1; Harvard University, 15; Brown University, 7; University of Illinois, 5; Bermuda Biological Station for Research, 4; University of California, 4; University of Chicago, 4; University of Pennsylvania, 4.

Edwin Bidwell Wilson
Massachusetts Institute of Technology, Cambridge, Mass.

SPECIAL ARTICLES

OPPORTUNITIES FOR CONTACT INFECTION[1]

An outstanding feature of the influenza pandemic is the remarkable infectivity of the disease. There is scarcely a community in

[1] Published by permission of the Surgeon-General of the Army.

this country that has escaped its visitation. Once introduced it has spread from person to person with truly amazing speed. This is partially accounted for by the very short incubation period, from two or four days. This furnishes new foci of infection at a much more rapid rate than is the case with certain other infectious diseases which require from five to twenty days to develop. So much for the progress of the disease, once rooted in the individual, but just how the infection is passed about so widely is a matter that is less easy to explain. Are the causative organisms transmitted from person to person by contact, or are they mixed with dust from saliva-laden streets and scattered broadcast by the wind? The trend of modern thought is to regard contact or hand to mouth transmission as by far the more important. It is only at such times as we have just experienced that there is a tendency to question the adequacy of this method. Dust holds out certain allurements because of its ubiquity and there is just enough of the mysterious associated with air-borne infection to be in keeping with a disease about which we know so little. Lest we wander too far from the truths which modern public health experience has taught us the following inventory of opportunities for contact transmision of disease is offered.

The writer recorded his chances of acquiring infections for an entire day. This list undoubtedly is typical for the average city dweller.

For the purpose of emphasis the items are recorded in detail:

1. Touched bathroom doorknob.
2. Touched toilet seat.
3. Touched toilet flush handle.
4. Touched chain on light.
5. Touched faucet handle. (Washed hands.)
6. Touched bathroom doorknob.
7. Touched knob of outside door.
8. Received paper from newsboy.
9. Grasped handle of trolley car.
10. Received transfer from conductor. (Gloves on hands from this time till entering restaurant.)
11. Grasped back of chair in restaurant.
12. Touched tumbler with hand.
13. Touched tumbler with lips.
14. Touched teaspoon with hand.
15. Touched teaspoon with lips.
16. Touched plate with hand.
17. Touched second teaspoon with hand.
18. Touched second teaspoon with lips.
19. Touched coffee cup with hand.
20. Touched coffee cup with lips.
21. Touched cream pitcher with hand.
22. Touched cereal dish with hand.
23. Touched toast with hand.
24. Placed toast in mouth.
25. Touched shredded wheat with hand.
26. Placed shredded wheat in mouth.
27. Touched second piece of toast with hand.
28. Placed second piece of toast in mouth.
29. Used handkerchief to nose.
30. Handled napkin.
31. Wiped mouth with napkin.
32. Touched back of chair.
33. Received check.
34. Received change from cashier.
35. Opened door.
36. Closed door. (Put on gloves.)
37. Used handkerchief to nose.
38. Handled toilet room door at office.
39. Touched swinging doors on toilet.
40. Touched toilet seat.
41. Touched flush handle.
42. Touched swinging doors on toilet. (Washed hands.)
43. Touched toilet room door knob.
44. Used handkerchief to nose.
45. Shook hands with visitor.
46. Received paper from visitor.
47. Used handkerchief to nose.
48. Shook hands with visitor.
49. Shook hands with second visitor.
50. Opened toilet room door.
51. Pressed toilet flush with hand.
52. Turned water faucet. (Washed hands.)
53. Opened lunchroom door.
54, 55, 56. Received three dishes from attendant.
57. Handled chair.
58. Handled water tumbler.
59. Carried glass to lips.
60. Put spoon in mouth.
61. Put fork in mouth.
62. Opened post office door.
63. Licked postage stamp handed out by clerk.
64. Opened post office door.
65. Opened office door.
66. Placed hand on rail.
67. Opened office door.

68. Grasped handle on trolley car.
69. Opened door of bank.
70. Grasped pen used by public.
71. Received bills from cashier.
72. Opened bank door.
73. Opened toilet room door.
74. Closed swinging doors.
75. Touched flush handle.
76. Opened swinging doors.
77. Touched faucet. (Washed hands.)
78. Opened toilet room door.
79. Pressed handle on drinking fountain with hand.
80. Handled toilet room door.
81. Pressed toilet flush.
82. Turned faucet handle. (Washed hands.)
83. Opened toilet room door.
84. Received newspaper.
85. Received change from newsboy.
86. Grasped car handle.
87. Received change from conductor. (Put on gloves.)
88. Opened restaurant door.
89. Handled chair.
90, 91, 92, 93. Handled knife, fork, spoon, tumbler.
94, 95, 96. Touched spoon, fork and tumbler to mouth.
97. Handled water pitcher.
98. Touched napkin.
99. Wiped mouth with napkin.
100. Grasped chair.
101. Used handkerchief to nose.
102. Handled cake.
103. Put cake in mouth.
104. Grasped chair.
105. Opened door.
106. Used handkerchief to nose.
107. Used toothpick, bringing hand to mouth.
108. Opened door to house.
109. Received paper from friend.
110. Friend laughed boisterously within spray range.
111. Used handkerchief to nose.
112. Closed bathroom door.
113. Pressed toilet flush.
114. Turned faucet handle. (Washed hands.)
115. Opened bathroom door.
116, 117. Shook hands with two people.
118. Touched light chain.
119. Passed candy to mouth with hands.

The above list shows 119 possibilities during the course of a day for acquiring infected material either on the hands, mouth or nose. We may sum up these incidents as follows:

Touching hands to articles that were or might have been touched by others immediately before	87
Shaking hands	5
Carrying to mouth articles possibly infected by others	17
Hand brought in contact with mouth directly.	2
Hand brought in contact with nose indirectly through handkerchief	7
Chances of acquiring infection through laughing of others	1
Chances of acquiring infection through sneezing of others	0
Chances of acquiring infection through coughing of others	0
Chances of acquiring infection through kissing.	0

There were 92 opportunities for infecting the hands directly with other hands or with articles just handled by others. Mere infection of the hands is of course immaterial. It is the carrying of the infected hand to the mouth or nose, which constitutes the danger. In the present instance the hand was brought in contact with the mouth or nose, either directly or through food, or through handling a handkerchief 14 times, 7 times in the case of the mouth and 7 in the case of the nose. This represents the experience of one to whom keeping hands out of the mouth is second nature. But what of the person who is unconscious of the hand to mouth habit? There is no question but that the hand travels to the mouth more frequently with the average individual.

There were seven opportunities of infecting the nose with the hand through the medium of the handkerchief. The influence of weather and climate on infection is suggested here by the fact that the colder or more changeable the weather the more frequently does the nose require attention and the opportunities for infecting the nose from the hand increase in proportion.

In making up this record of articles touched by the hands, it should be emphasized that only those instances have been recorded which offered the possibility of infection through

recent handling of the article by others. Contact with papers, pencils, etc., handled remotely by others have not been included.

Another point that stands forth is that our hands are dangerous to others only in proportion to the frequency with which we infect them with our mouth and nose. The present experience shows seven hand-to-nose contacts and but two direct hand-to-mouth contacts. The handkerchief thus looms up as a factor of importance. Through it we may infect our hands from our nose, which is dangerous to others, and also infect our nose with our hands which is dangerous to ourselves.

Several lessons of practical value suggest themselves from the above related experience. They are:

I. That we should use handkerchiefs one side of which is conspicuously colored or marked so that we may always apply the hands to one side reserving the other side for the nose. This will protect our own nose from our hands and help to prevent the infection of our hands.

II. That we should abandon the universal practise of shaking hands, substituting some other less intimate method of salutation.

III. That we should encourage means which will lessen the opportunity for public restaurant employees to handle eating utensils.

GEORGE T. PALMER,
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A PRELIMINARY NOTE ON A BACTERIAL DISEASE OF FOXTAIL

DURING the month of September and up until the middle of November, 1918, a striking disease on foxtail (*Setaria glauca* (L.) Beauv.) was noticeable around Fayetteville, Ark. The disease was rather widespread in this vicinity and it is quite probable that it is prevalent throughout the state of Arkansas at least. The disease manifests itself as dark brown spots and streaks, varying in size from small, oval or roundish spots, 1–2 mm. in diameter, to elongated streaks, 2–3 cm. in length. The attacked areas are to be found on leaves, flowering stalks and glumes. The pathogen, a white, rod-shaped bacterium was isolated and obtained in pure culture. It was inoculated on healthy leaves by using a sterile, platinum needle and smearing the organism on the leaf. Within three to four days inoculated spots showed the characteristic browning of the tissue. The organism was then reisolated and obtained in pure culture from the inoculated spots.

Both by spraying and by needle smears this organism was successfully inoculated on wheat, oats, rye, barley, corn and Sudan grass; it was reisolated and obtained in pure culture from each of the above-named hosts. Infections were also obtained on sorghum and millet but no reisolations have been obtained from these up to the time of writing.[1] Judging from the appearance of infected plants in the greenhouse all the cereals mentioned, except corn and the various grasses of the *Sorghum* group, are quite seriously attacked. The effect on oats is not unlike the halo blight recently described by Miss Elliott[2] and it is likely that the organisms under discussion is the same as Mann's[3] *Pseudomonas avenæ*. However, the identity of the organism is still in doubt and the work is being continued.

H. H. ROSEN

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THE AMERICAN METRIC ASSOCIATION

THE following is a summary of the proceedings of the second annual meeting of the American Metric Association (156 Fifth Avenue, New York City), held in Baltimore on December 27 and in Washington on December 28.

Mr. David A. Molitor, consulting engineer, outlined his work for the C. E. Schmidt Co., of Detroit, tanners. He found that about 500 different commodities were being purchased for the use of this company and that they were received in many different units of weight and measure. It became clear that economy would be effected by entering the weight or measure of all material received in

[1] Since this article was written the organism has also been reisolated from these hosts.

[2] Elliott, C., "Bacterial Oat Blight," *Phytopath.* 8: 489, 1918.

[3] Manns, T. F., "The Blade Blight of Oats," Ohio Agri. Exp. Sta. Bul. 210, 1909.

metric units. This step was taken with great success. The metric weights and measures were then used exclusively throughout the factory. The output of the factory was increased approximately 50 per cent. with the same working staff. The weighing in one department had previously been made by an expert in the old weights and measures. After the change to the metric system, this work was done by a laborer with fewer mistakes than formerly. Mr. Molitor estimated that a saving of approximately 20 per cent. could be effected in the bookkeeping and calculations of factories which introduced the metric weights and measures throughout.

Dr. C. O. Mailloux, consulting engineer, chairman of the United States Committee of the International Electro-Technical Commission, told of his practical experiences in the use of the metric system in the United States and foreign countries, describing his last interview with Sir John Wolfe Barry, who designed the London Bridge and other engineering enterprises in England. He expressed to Dr. Mailloux his firm conviction of the desirability and necessity for adopting the metric weights and measures in England and discussed the practical steps contemplated for their general use. Dr. Mailloux pointed out the fact that the electrical units throughout the world were based on metric weights and measures and that this in itself was indicative of their ultimate adoption for all purposes in America and England.

Mr. Jesse M. Smith, past president of the American Society of Mechanical Engineers, stated that he had been in close touch with the metric movement for fifty years. He had studied in Berlin during the winter following the Franco-Prussian War. The metric system was then used in the text-books and also for practical work throughout Germany. He had frequently used the metric system in America and other countries since then and believed it to be only a question of time when the metric system would be adopted in all parts of the world.

Professor Eugene C. Bingham, of Lafayette College, was appointed chairman of the Committee on Sections of the American Metric Association. The following resolution on this subject was adopted:

"*Resolved,* that the American Metric Association hereby requests the formation of local sections throughout the country."

United States Senator John F. Shafroth, read bill S5037, which he has introduced in congress and asked for a discussion on the subject. This bill is a step toward the general use of metric weights and measures, making exceptions where such seem to be advisable for special work. The bill was endorsed by the American Metric Association.

Secretary of Commerce, Honorable William C. Redfield was the principal speaker at the "Metric Dinner," held on the evening of the twenty-seventh. After outlining his practical experience as a manufacturer for thirty years and his travels in other countries in the interests of his export trade, he voiced the conviction that the metric weights and measures should and would be adopted for general use in the United States. The Secretary of Commerce said in part: "I believe that the metric system offers a return to simplicity, offers an effectiveness of thought, offers more to little children in our schools if you please, which we are not justified in withholding from them."

The following officers were elected for the year 1919: *President*—George F. Kunz, New York; *First Vice-President*—Wm. Jay Schiefflin, New York; *Second Vice-President*—Jesse M. Smith, New York; *Third Vice-President*—David A. Molitor, Detroit; *Treasurer*—Arthur P. Williams, New York; *Secretary*—Howard Richards, Jr., New York.

The following were among the resolutions passed:

"*Resolved,* that the American Metric Association hereby expresses its desire to cooperate more fully with those American industries and trades using and contemplating the use of metric weights and measures.

"*Resolved,* that the American Metric Association send greetings to the universities, colleges and other educational institutions and respectfully invite their cooperation in bringing in the general use of meters, liters and grams for the welfare of America."

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